Dart Aerospace Ltd.

Date: Wednesday, 4/5/2006 3:30:54 PM
User: Kim Johnston

Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	**Drawing Name**	: FWD TUBE ASSEMBLY
Job Number	: 26570		
Estimate Number	: 10467		
P.O. Number	: N/A	**Part Number**	: D3391021
This Issue	: 4/5/2006 **S.O. No.** : N/A	**Drawing Number**	: D3391 REV D
Prsht Rev.	: NC	**Project Number**	: N/A
First Issue	: N/A **Type** : MACHINED PARTS	**Drawing Revision**	: D
Previous Run	: 26569	**Material**	: N/A
Written By	: See COMMENT BELOW	**Due Date**	: 4/28/2006 **Qty:** 1 **Um:** Each
Checked & Approved By	: 06.04.06		
Comment	: Est. A 05.09.13 New issue KJ/JLM		
	Est. B 06.02.10 Dwg rev.D ecn 773 EC		

Additional Product

Job Number:

Seq. #:	Machine Or Operation:	Description :
1.0	D6013047	SKIDTUBE MAT'L

Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)
SKIDTUBE MAT'L
Pick:

Qty	Part Number	Description	Batch
1	D6013-047	Extrusion	B23935 DP 06-4-9

2.0	LANDING GEAR 1	LANDING GEAR RESOURCE 1

Comment: LANDING GEAR RESOURCE 1
Cut extrusion to 46.52 +0.010 -0.020

3.0	BENDING	BENDING MACHINE

Comment: Nc bender
Bend as per Dwg D3391 Using Bend Prog 3391021 DP 06-4-9 1

4.0	QC5	INSPECT WORK TO CURRENT STEP

Comment: INSPECT WORK TO CURRENT STEP 06.04.13 1

5.0	HAAS1	HAAS CNC VERTICAL MACHINING #1

Comment: HAAS CNC VERTICAL MACHINING #1
1-Machine as per Folio FA590 Rev. AA & Dwg D3391 Rev. D
Identify as D3391-1

2-Deburr 06/04/15 1

Form: rprocess

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

QA: N/C Closed: _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Date: Wednesday, 4/5/2006 3:30:54 PM
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Customer: CU-DAR001 Dart Helicopters Services **Drawing Name:** FWD TUBE ASSEMBLY

Job Number: 26570 **Part Number:** D3391021

Job Number:

Seq. #:	Machine Or Operation:	Description :
6.0	QC2	INSPECT PARTS AS THEY COME OFF MACHINE

Comment: INSPECT PARTS AS THEY COME OFF MACHINE MB 06/04/15 1

7.0	QC8	SECOND CHECK

Comment: SECOND CHECK MB 06/04/26 1

8.0	LANDING GEAR 1	LANDING GEAR RESOURCE 1

Comment: LANDING GEAR RESOURCE 1

1-Drill and c'sink float bag holes as per Dwg D3391 using DT8798(Do not open tow cap holes to finish size)
(ONLY DRILL HOLES MARKED "A") BE 06/04/27 (1)

2-Drill Remaining two holes for tow cap using DT 8819 Locating off of .1875" holes drilled in previous step BE 06/04/27 (1)

3-Open tow cap holes to .208" as per Dwg D3391 BE 06/04/27 (1)

4-Open Tow Ring hole to .640" as per Dwg D3391 BE 06/04/27 (1)

5-Drill wearplate holes as per Dwg D3391 Using Dt8217 & DT8878 BE 06/04/27 (1)

6--Deburr BE 06/04/27 (1)

9.0	HAND FINISHING1	HAND FINISHING RESOURCE #1

Comment: HAND FINISHING RESOURCE #1
Acid etch and Alodine as per QSI 005 4.1 FC 06 05 03 (1)

10.0	POWDER COATING	POWDER COATING

Comment: POWDER COATING
Powder Coat White Gloss (Ref: 4.3.5.1) as per QSI 005 4.3 DL 06/06/05 (1)

11.0	QC3	INSPECT POWDER COAT/CHEMICAL CONVERSION

Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION MB 06 06 05 (1)

8.1 QC5 DP 06-5-2

9.1 QC3 DL 06/06/05 (1)

Form: rprocess

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

QA: N/C Closed: _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Date: Wednesday, 4/5/2006 3:30:54 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services **Drawing Name:** FWD TUBE ASSEMBLY

Job Number: 26570 **Part Number:** D3391021

Job Number:

Seq. #:	Machine Or Operation:	Description :
12.0	D3401041	Tow Cap Assembly

Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)
Tow Cap Assembly
Pick:

Qty	Part Number	Description	Batch
1	D3401-041	Tow Cap	B26590

13.0	AN3C4A	BOLT

Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
Bolt
Pick:

Qty	Part Number	Description	Batch
4	AN3C4A	Bolt	M100651

14.0	NAS1330C3KB166	

Comment: Qty.: 14.0000 Each(s)/Unit Total : 14.0000 Each(s)
Rivnut
Pick:

Qty	Part Number	Description	Batch
14	NAS1330C3KB166	Insert	M100732

15.0	NAS1515H3L	WASHER

Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
Washer
Pick:

Qty	Part Number	Description	Batch
4	NAS1515H3L	Washer	M100186

16.0	AN960C10L	washer

Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
washer M18822 DL 04/04/05 (1)

17.0	HAND FINISHING1	HAND FINISHING RESOURCE #1

Comment: SMALL & MEDIUM FAB RESOURCE 1
Install inserts and Tow Cap as per Dwg D3391
Identify as D3391-021 DL 04/06/05 (1)

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	Prod Eng. **Qty**	**Approval** ~~Chief Eng / Prod Mgr~~	**Approval** QC Inspector
06 06 08	12.0 13.0 15.0 16.0	Should be put on Float skid Assembly W/O	MM	06 06 08			06.06.14

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes (No) **DQA:** _____ **Date:** 06/06/14

QA: N/C Closed: _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Date: Wednesday, 4/5/2006 3:30:54 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services **Drawing Name:** FWD TUBE ASSEMBLY

Job Number: 26570 **Part Number:** D3391021

Job Number:

Seq. #:	Machine Or Operation:	Description :
18.0	QC5	INSPECT WORK TO CURRENT STEP

Comment: INSPECT WORK TO CURRENT STEP
Inspect thread of each insert using DT8821 MM 06 06 05 (1)

19.0	PACKAGING 1	PACKAGING RESOURCE #1

Comment: PACKAGING RESOURCE #1
Identify and Stock
Location: N/A DC 06/06/12 (1)

20.0	DC	DOCUMENT CONTROL

Comment: DOCUMENT CONTROL
Inspection Level 21 06/06/14 (1)

Job Completion

LL 06-06-14

Form: rprocess

Dart Aerospace Ltd

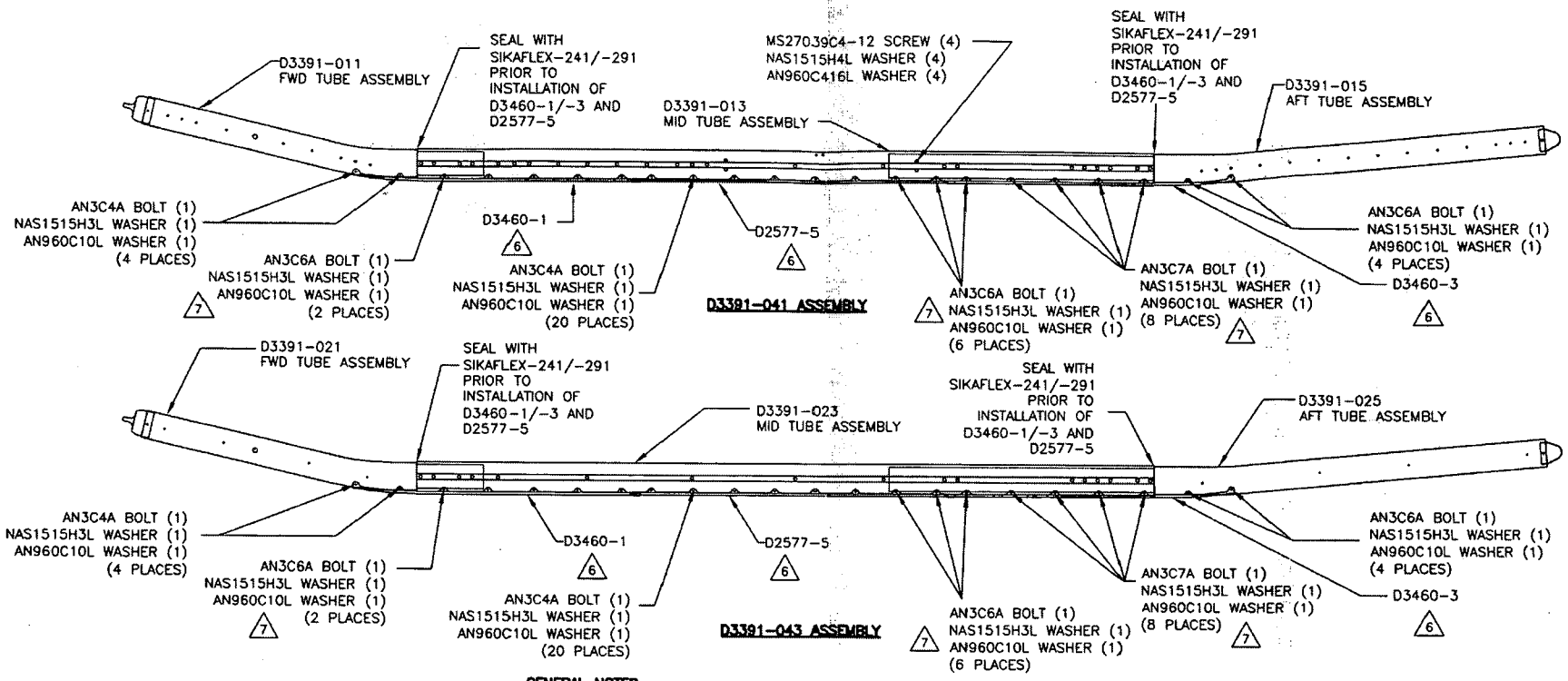
W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

QA: N/C Closed: _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries



D3391-041/-043 FLOAT SKIDTUBE ASSEMBLY PARTS LIST

QTY - 041	QTY - 043	PART NUMBER	DESCRIPTION
X		D3391-041	FLOAT SKIDTUBE ASSEMBLY
	X	D3391-043	FLOAT SKIDTUBE ASSEMBLY
1		D3391-011	FWD TUBE ASSEMBLY
1		D3391-013	MID TUBE ASSEMBLY
1		D3391-015	AFT TUBE ASSEMBLY
	1	D3391-021	FWD TUBE ASSEMBLY
	1	D3391-023	MID TUBE ASSEMBLY
	1	D3391-025	AFT TUBE ASSEMBLY
24	24	AN3C4A	BOLT
12	12	AN3C6A	BOLT
8	8	AN3C7A	BOLT
44	44	NAS1515H3L	WASHER
44	44	AN960C10L	WASHER
4		MS27039C4-12	SCREW
4		NAS1515H4L	WASHER
4		AN960C416L	WASHER
1	1	D2577-5	WEARSHOE
1	1	D3460-1	WEARSHOE
1	1	D3460-3	WEARSHOE

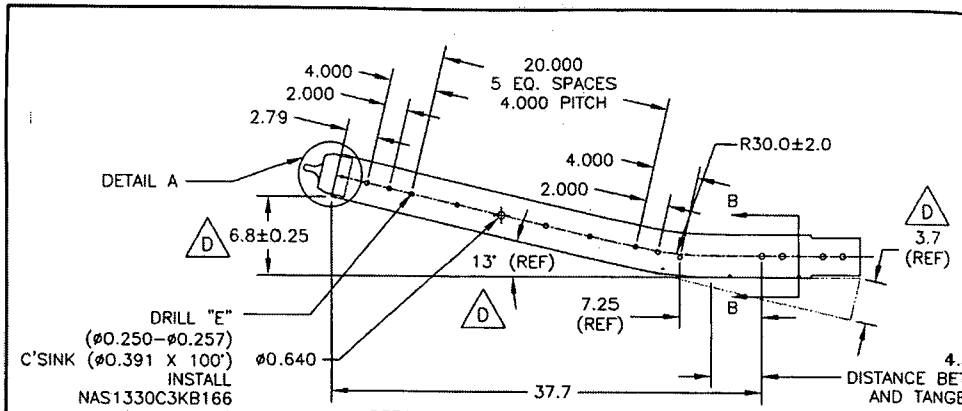
GENERAL NOTES

1) ALL DIMENSIONS ARE IN INCHES
2) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
3) FINISH: ACID ETCH AND ALODINE PER DART QSI 005 4.1
   POWDER COAT WHITE (4.3.5.1) PER DART QSI 005 4.3
4) SPRAY INSIDE OF TUBE WITH A COAT OF LPS LABORATORIES "LPS-3" AFTER FINISH AND AFTER INSTALLATION OF INSERTS. COAT ALL EXPOSED FASTENERS WITH LPS LABORATORIES "LPS PROCYON" AFTER FINAL ASSEMBLY, CLEAN EXCESS OFF POWDER COATING WITH MEK DEGREASER.
5) USE DART DRILL TEMPLATE DT8217 TO LOCATE AND DRILL 'E' SIZE HOLES (ø0.250-ø0.257) FOR WEARSHOE INSERTS. C'SINK ø0.391/ø0.425 x 100° AS APPLICABLE AND INSTALL INSERTS EXCEPT WHERE INDICATED.
6) APPLY A LAYER OF SIKAFLEX -241/-291 ADHESIVE BETWEEN THE BOTTOM OF THE SKIDTUBE ASSEMBLY AND THE WEARPLATES
7) DO NOT TORQUE, HAND TIGHTEN ONLY

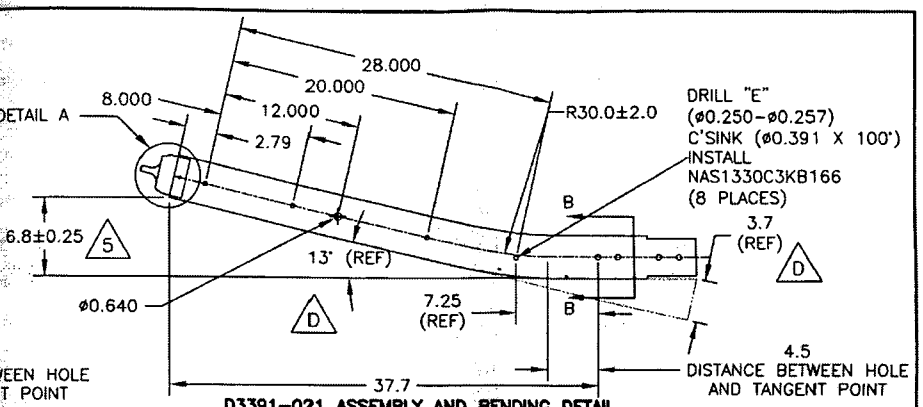
RELEASED
06.01.27

D	06.01.23	UPDATE TOLERANCE, CHANGE HOLE SIZE
C	05.09.27	LENGTHEN AFT EXTENSION
B	05.06.10	DRAWING UPDATES
A	05.02.07	NEW ISSUE

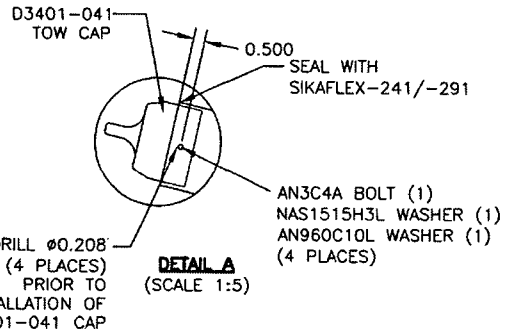
DESIGN	DRAWN BY	DART AEROSPACE USA, INC. PORT HADLOCK, WA
PH	PH	
CHECKED	APPROVED	DRAWING NO. D3391 — REV. D — SHEET 1 OF 5
DATE 06.01.23		TITLE 412 FLOAT SKIDTUBE — SCALE NTS



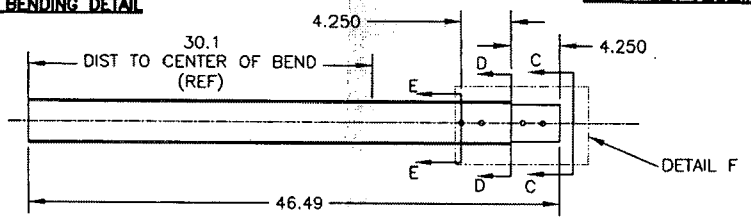
D3391–011 ASSEMBLY AND BENDING DETAIL



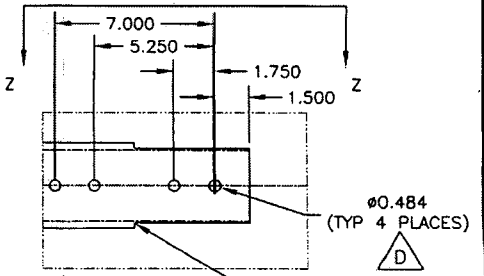
D3391–021 ASSEMBLY AND BENDING DETAIL



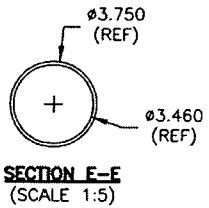
DETAIL A
(SCALE 1:5)



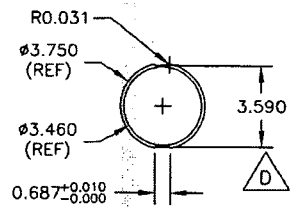
D3391–1 DRILLING AND CUTTING DETAIL
(MAKE FROM D6013–047 SKIDTUBE MATERIAL)



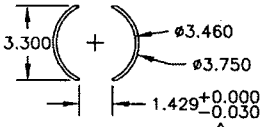
DETAIL F
(SCALE 1:5)



SECTION E–E
(SCALE 1:5)



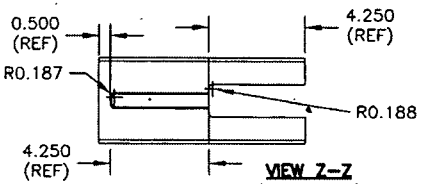
SECTION D–D
(SCALE 1:5)



SECTION C–C
(SCALE 1:5)

5 DRILL "E"
(ø0.250–ø0.257)
C'SINK (ø0.391 X 100°)
INSTALL
NAS1330C3KB166
(6 PLACES)

SECTION B–B
(SCALE 1:5)



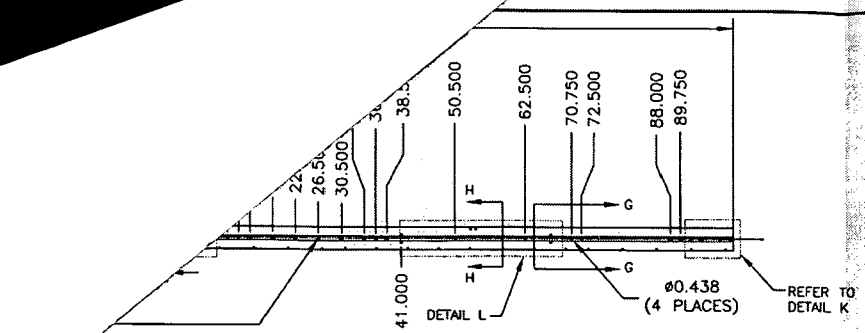
VIEW Z–Z
(SCALE 1:5)

RELEASED
06.01.23

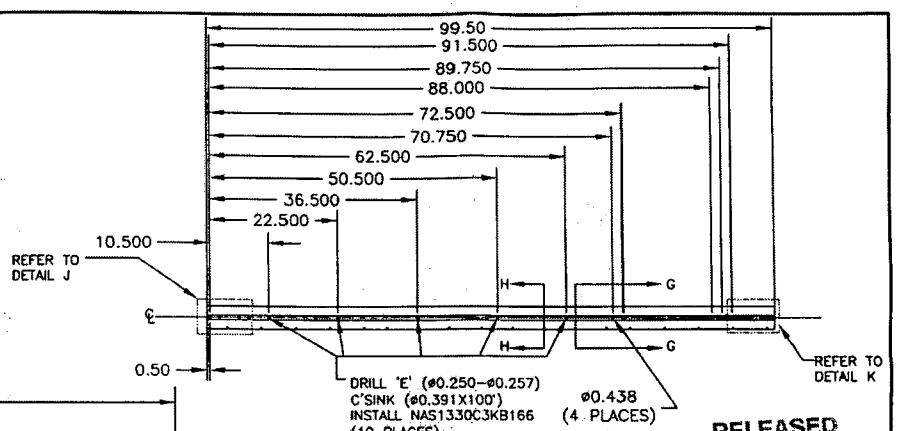
D3391–011/–021 FWD TUBE ASSEMBLY PARTS LIST

QTY - 011	QTY - 021	PART NUMBER	DESCRIPTION
X		D3391-011	FWD TUBE ASSEMBLY
	X	D3391-021	FWD TUBE ASSEMBLY
1	1	D6013-047	FWD TUBE
1	1	D3401-041	TOW CAP
4	4	AN3C4A	BOLT
4	4	NAS1515H3L	WASHER
4	4	AN960C10L	WASHER
24	14	NAS1330C3KB166	INSERT

DESIGN	DRAWN BY	DART AEROSPACE USA, INC. PORT HADLOCK, WA
PH	PH	
CHECKED	APPROVED	DRAWING NO. D3391 REV. D
		SHEET 2 OF 5
DATE 06.01.23		TITLE 412 FLOAT SKIDTUBE SCALE 1:10

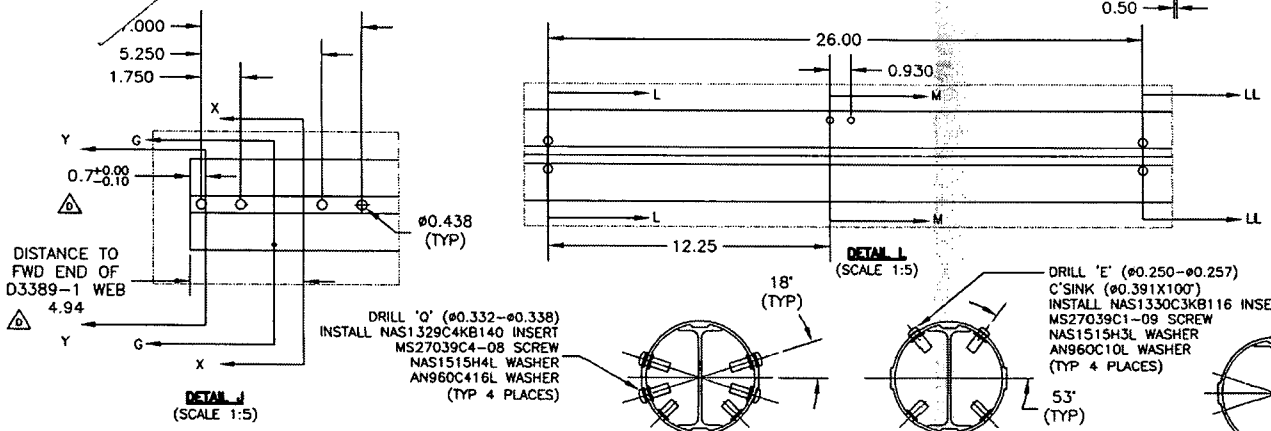


D3391-013 ASSEMBLY DETAIL



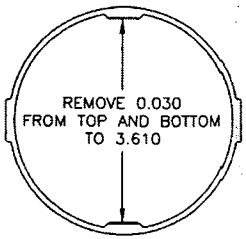
D3391-023 ASSEMBLY DETAIL

RELEASED
06.01.27

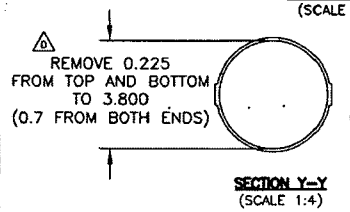


D3391-013/-023 MID TUBE ASSEMBLY PARTS LIST

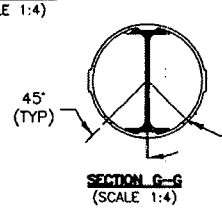
QTY - 013	QTY - 023	PART NUMBER	DESCRIPTION
X		D3391-013	MID TUBE ASSEMBLY
	X	D3391-023	MID TUBE ASSEMBLY
1	1	D2500-1-100	EXTRUSION
1	1	D3389-1	WEB
24	20	NAS1330C3KB116	INSERT
24	10	NAS1330C3KB166	INSERT
4		NAS1329C4KB140	INSERT
4		NAS1515H3L	WASHER
4		AN960C10L	WASHER
4		NAS1515H4L	WASHER
4		AN960C416L	WASHER
4		MS27039C1-09	SCREW
4		MS27039C4-08	SCREW



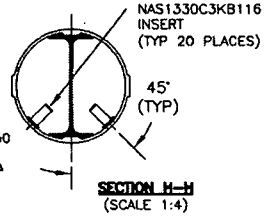
SECTION X-X
(SCALE 1:2)



SECTION Y-Y
(SCALE 1:4)



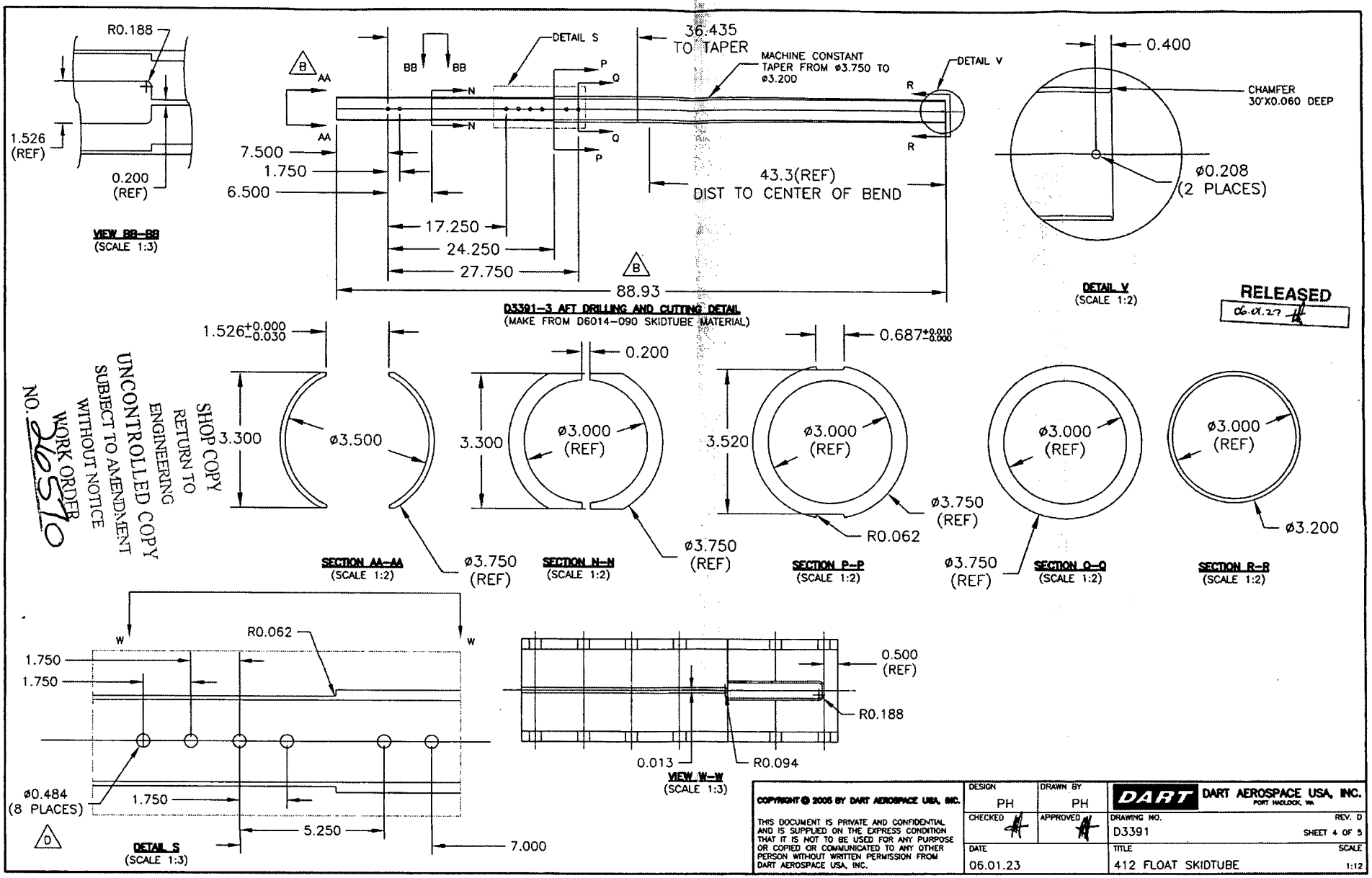
SECTION G-G
(SCALE 1:4)



SECTION H-H
(SCALE 1:4)

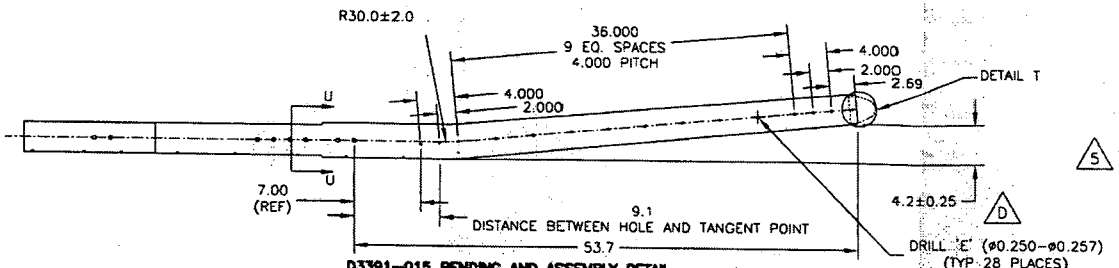
D3391-013/-023 MID TUBE ASSEMBLY
1) MATERIAL: MAKE FROM D2500-1-100 EXTRUSION
2) INSTALL D3389-1 WEB TO OUTER TUBE USING SIKAFLEX-241-291 PER QSI 015

DESIGN	DRAWN BY	DART AEROSPACE USA, INC. PORT HADLOCK, WA
PH	PH	
CHECKED	APPROVED	DRAWING NO. D3391 REV. D
		SHEET 3 OF 5
DATE 06.01.23		TITLE 412 FLOAT SKIDTUBE SCALE 1:20

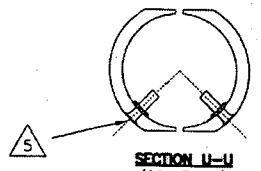


DESIGN	DRAWN BY	DART AEROSPACE USA, INC. PORT HADLOCK, WA
PH	PH	
CHECKED	APPROVED	DRAWING NO. D3391 — REV. D
		SHEET 4 OF 5
DATE 06.01.23		TITLE 412 FLOAT SKIDTUBE — SCALE 1:12

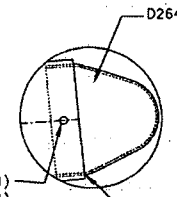
RELEASED
06.01.27



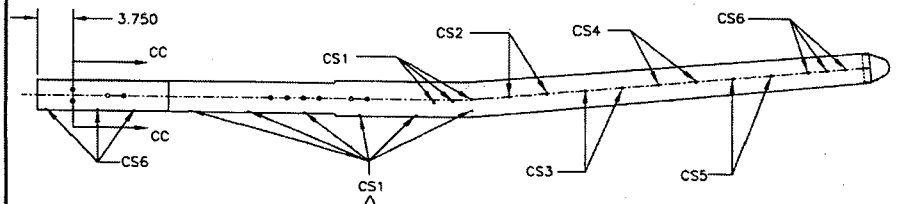
D3391-015 BENDING AND ASSEMBLY DETAIL



SECTION U-U
(SCALE 1:3)



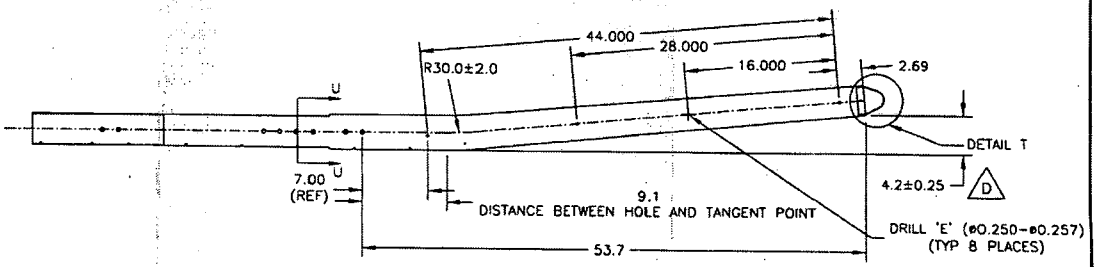
DETAIL T
(SCALE 1:3)



D3391-015 INSERT INSTALLATION DETAIL
(SEE TABLE)

C'SINK AND INSTALL AESS10KBXXX AND/OR NAS1330C3KBXXX IN HOLES MARKED CS1-CS6 AS FOLLOWS

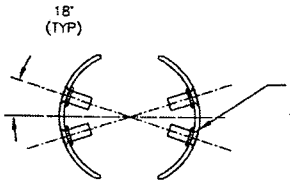
HOLES MARKED	QTY D3391-015	QTY D3391-025	C'SINK	P/N
CS1	18	14	ø0.425	AESS10KB366
CS2	4		ø0.391	AESS10KB366
CS3	4	2	ø0.391	NAS1330C3KB316
CS4	4	2	ø0.391	NAS1330C3KB266
CS5	4		ø0.391	NAS1330C3KB216
CS6	12	8	ø0.391	NAS1330C3KB166



D3391-025 BENDING AND ASSEMBLY DETAIL

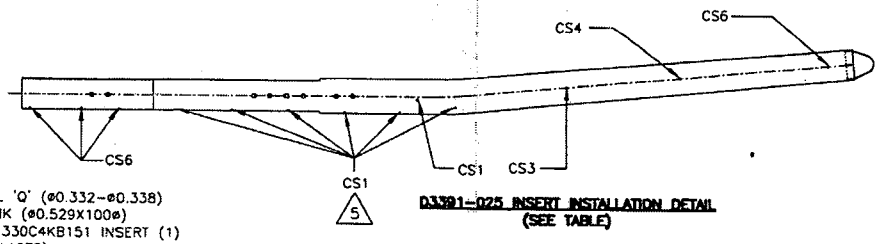
D3391-015/-025 AFT TUBE ASSEMBLY PARTS LIST

QTY - 015	QTY - 025	PART NUMBER	DESCRIPTION
X		D3391-015	AFT TUBE ASSEMBLY
	X	D3391-025	AFT TUBE ASSEMBLY
1	1	D6014-090	AFT TUBE
1	1	D2646	AFT CAP
18	14	AESS10KB366	INSERT
4	2	NAS1330C3KB316	INSERT
4	2	NAS1330C3KB266	INSERT
4		NAS1330C3KB216	INSERT
12	8	NAS1330C3KB166	INSERT
4		NAS1330C4KB151	INSERT
2	2	AN3C4A	BOLT
2	2	NAS1515H3L	WASHER
2	2	AN960C10L	WASHER



SECTION CC-CC
(SCALE 1:3)

DRILL 'Q' (ø0.332-ø0.338)
C'SINK (ø0.529X100ø)
NAS1330C4KB151 INSERT (1)
(4 PLACES)



D3391-025 INSERT INSTALLATION DETAIL
(SEE TABLE)

DESIGN	DRAWN BY	DART AEROSPACE USA, INC. PORT HADLOCK, WA
PH	PH	
CHECKED	APPROVED	DRAWING NO. D3391 REV. D
		SHEET 5 OF 5
DATE 06.01.23		TITLE 412 FLOAT SKIDTUBE SCALE 1:12

DART AEROSPACE LTD	Work Order:	
Description: FWD TUBE	Part Number:	D 3391-1
Inspection Dwg: D3391 Rev: D		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☑ First Article ☐ Prototype

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
R0.031	±.010	R0.032	—			
0.687	+.016 −.000	0.690	—			
3.590	±.010	3.600	—			3.606 } 06.04.24
3.300	±.010	3.310	—			3.318 } ~~RH~~
1.429	+.000 −.030	1.420	—			1.463 } see e-mail
4.250	±.010	4.254	—			
4.250	±.010	4.258	—			
Ø0.484	+.006 −.001	Ø0.486	—			
1.500	±.005	1.502	—			
1.750	±.005	1.748	—			
5.250	±.005	5.248	—			
7.000	±.005	6.998	—			
/						

Measured by:	GML
Date:	06/04/15

Audited by:	
Date:	

Prototype Approval:	06/04/24
Date:	~~RH~~

Rev	Date	Change	Revised by	Approved
A		New Issue	KJ/RF	

Peter Hum

From: David Shepherd [davids@dartaero.com]
Sent: Friday, April 21, 2006 10:59 AM
To: Peter Hum
Subject: Re: D3391-1 fwd tube tolerance update

The deviation on tolerance shown in your sketch is acceptable for current production and would be acceptable for future production with a drawing change and confirmation that production can work to these tolerances.

When you do the design review for the drawing change, ensure to include the sketch. I would suggest that we submit the updated dwg when we submit the drawings for the cable guard.

David

----- Original Message -----
From: "Peter Hum" <phum@dartaero.com>
To: "David Shepherd (E-mail)" <davids@dartaero.com>
Sent: Wednesday, April 19, 2006 12:53 PM
Subject: D3391-1 fwd tube tolerance update

> David,
>
> I've attached a sketch (the proposed changes are in black),
>
> In machining the D3391-1 fwd tube, the dimensions of Section D-D and Section
> C-C vary above/below the specified tolerance. In the majority of the cases
> the end result is more material and therefore an increase in strength.
>
> At the worst case tolerance (i.e. smallest area) the reduction in area is
> 0.5%. However in the critical section of the FWD tube, the ultimate margin
> of safety is 21%. Therefore, this reduction in area is very small compared
> to the overall margin of safety; therefore it will be acceptable.
>
> Can these deviations be applied to current and future production (will
> require drawing update)?
>
> Peter
>
>